



NWT OFFICE OF THE REGULATOR OF OIL AND GAS OPERATIONS

Office of the Regulator of Oil and Gas Operations

P.O. Box 1320, Yellowknife, NT X1A 2L9

Tel: 867-767-9097 • Fax: 867-920-0798 • Web: www.oroogo.gov.nt.ca

Courier Address: 4th floor, 5201 – 50th Avenue, Yellowknife, NT X1A 3S9

Ryan Munro, P.Eng.
Manager, Abandonment Engineering
Canadian Natural Resources Ltd.
Suite 2100, 8800 – 2 ST SW
CALGARY AB T2P 4J8

December 15, 2022

Dear Ryan Munro:

Decision: ACW-2019-016-CNRL-K-35-WID1991 Variation 3

On December 12, 2022, the Office of the Regulator of Oil and Gas Operations (OROGO) received an application from Canadian Natural Resources Ltd. (CNRL) to vary ACW-2019-016-CNRL-K-35-WID1991 variation 2 by changing the wellbore abandonment program for the Arrowhead River K-35 well (WID1991).

The Regulator designated under section 121 of the *Oil and Gas Operations Act* (OGOA) may issue an Operations Authorization under section 10(1) of that act, subject to any Well Approvals that the Regulator may require under section 10(4) of OGOA. The Regulator may vary the terms of an Operations Authorization under section 10(6) of OGOA, including the terms of a Well Approval. On August 2, 2020, the Commissioner in Executive Council designated me as the Regulator under section 121 of OGOA.

I have reviewed CNRL's description of its proposed activity and find that the application demonstrates that this activity will be conducted safely, without waste and without pollution, in compliance with the *Oil and Gas Drilling and Production Regulations*. Therefore, CNRL's application for a variation is approved, subject to the terms contained in the attached Well Approval.

CNRL must post a copy of the attached Well Approval in a clearly visible location at the work site.

Sincerely,



Pauline de Jong
Regulator

Encl. ACW-2019-016-CNRL-K-35-WID1991 variation 3

c. James Ireland, Well Abandonment Engineer, CNRL
Logan Simmonds, Abandonment Engineer, CNRL

WELL APPROVAL

Subject to the terms listed below, well approval **ACW-2019-016-CNRL-K-35-WID1991 variation #3** is granted under Section 10 of the *Oil and Gas Operations Act* and Part 2 of the *Oil and Gas Drilling and Production Regulations* to


| Company Name | Operating Licence # |
|--|----------------------------|
| Canadian Natural Resources Ltd. | NWT-OL-2014-001 |
| Responsible Officer | Operations Authorization # |
| Ryan Munro, Manager, Abandonment Engineering | OA-2018-005-CNRL |

for

| Well Name and Well ID# | |
|--------------------------------|--------|
| Arrowhead River K-35 (WID1991) | |
| Type of Work | Region |
| Abandonment | Dehcho |

This approval, originally issued on July 6, 2020, has been varied by the Regulator or its delegate under Section 10(6) of the *Oil and Gas Operations Act*.

This approval expires on **November 1, 2023**.

| Issued at | Issued on |
|------------------------------------|--|
| Yellowknife, Northwest Territories | December 15, 2022 |
| Issued by | Signature |
| Pauline de Jong, Regulator |  |

Additional Terms

1. Canadian Natural Resources Limited shall cause the approved work and activities to be conducted in accordance with the requirements of the *Oil and Gas Operations Act* and the *Oil and Gas Drilling and Production Regulations*, as well as any other acts or legislation as may apply.
2. Canadian Natural Resources Limited shall cause the approved work and activities to be conducted in accordance with any guidelines and/or interpretation notes issued by the Regulator under section 18 of the *Oil and Gas Operations Act*.
3. Canadian Natural Resources Limited is granted an exception from section 6A, Downhole Abandonment Requirements of the *Well Suspension and Abandonment Guidelines and Interpretation Notes* to allow for the setting of a permanent bridge plug at a depth of 2,418 mKB in order to abandon the Slave Point zone as noted in Step 33 of the approved abandonment program.
4. Canadian Natural Resources Limited shall cause the approved work and activities to be conducted in accordance with the specifications, standards and other information referred to in its application received February 27, 2020, request for variation dated December 12, 2022, and other submissions.
5. Canadian Natural Resources Limited shall request approval from the Regulator prior to undertaking any change to or deviation from the authorized work or activities, including but not limited to key personnel, the safety plan, the environmental protection plan, contingency plans and the approved abandonment program.
6. Pursuant to section 67 of the *Oil and Gas Drilling and Production Regulations*, Canadian Natural Resources Limited is approved to conduct controlled flaring utilizing separator packages and/or flare stacks as part of well kill operations at a maximum daily flow rate of $30 \times 10^3 \text{ m}^3/\text{day}$ and maximum daily duration of 4.0 hours per day. CNRL is also approved to conduct controlled venting of sweet gas as part of well kill operations at a maximum daily flow rate of $900 \text{ m}^3/\text{day}$ and maximum daily duration of 4.0 hours per day. CNRL shall include the volume and composition of any amount of flared and/or vented gas in its daily report to OROGO. Flaring and/or venting of any volume, daily volume rate and/or duration greater than the approved maximum daily flow shall be reported to OROGO as an incident under section 75 of the *Oil and Gas Drilling and Production Regulations*.
7. Canadian Natural Resources Limited shall notify OROGO of and demonstrate, to the satisfaction of the Regulator, the location of the cement top prior to completion of wellbore and surface abandonment. Notification must include the results and interpretation of the completed radial cement bond log as outlined in Step 35 of the Wellbore Abandonment Program.

8. Canadian Natural Resources Limited shall notify the Regulator of each interval targeted for remedial cementing prior to perforation by sending an email to orogo@gov.nt.ca that includes the depth and anticipated time frame operations will occur. Following completion of each remedial cementing interval, Canadian Natural Resources Limited must include detailed results on the operations including feed rate and cement volume.
9. Canadian Natural Resources Limited shall provide all staff and contractors for this program with its Emergency Response Plan and the OROGO 24-hour Incident Reporting phone number (867-445-8551) prior to commencing any work or activity.
10. Canadian Natural Resources Limited shall notify OROGO at least 10 days prior to the start of well abandonment operations.
11. Canadian Natural Resources Limited shall submit to OROGO certificates and inspection documents for any service rig, well control and associated equipment (including boilers) at least 10 days prior to the rig commencing work.
12. Canadian Natural Resources Limited shall submit to OROGO an updated operator contact list for this program prior to any work or activity.
13. Canadian Natural Resources Limited shall submit to OROGO a Daily Report outlining all activities undertaken for each day of the operation under this well approval no later than 10:00 a.m. the following day.
14. Canadian Natural Resources Limited shall submit to OROGO a completed Change of Well Status form 30 days after the service rig release date or when the operation has been successfully completed.
15. Canadian Natural Resources Limited shall complete gas migration (GM) testing between July and September 2023, as described in section 4A of the *Well Suspension and Abandonment Guidelines and Interpretation Notes*. Canadian Natural Resources Limited shall notify OROGO at least 10 days prior to conducting GM testing and submit a report of the GM testing results to the Regulator within 30 days of conducting the testing. Should analysis of the methane be required to determine the thermogenic source, Canadian Natural Resources Limited must notify OROGO with an anticipated timeframe to submit the analytical results.